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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/599,293	03/20/2008	Masaki Ohara	IWI-16783	6590
7609	7590	03/17/2010	EXAMINER	
RANKIN, HILL & CLARK LLP			SAVAGE, JASON L	
23755 Lorain Road - Suite 200			ART UNIT	PAPER NUMBER
North Olmsted, OH 44070-2224			1794	
			MAIL DATE	DELIVERY MODE
			03/17/2010	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/599,293	OHARA ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	JASON L. SAVAGE	1794	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

1) Responsive to communication(s) filed on 08 January 2010.  
 2a) This action is **FINAL**.                            2b) This action is non-final.  
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

4) Claim(s) 1-4,8-19,28,32-38,40 and 42-53 is/are pending in the application.  
 4a) Of the above claim(s) 46-53 is/are withdrawn from consideration.  
 5) Claim(s) \_\_\_\_\_ is/are allowed.  
 6) Claim(s) 1-4,8-19,28,32-38,40 and 42-45 is/are rejected.  
 7) Claim(s) \_\_\_\_\_ is/are objected to.  
 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

9) The specification is objected to by the Examiner.  
 10) The drawing(s) filed on 25 September 2006 and 20 March 2008 is/are: a) accepted or b) objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) All    b) Some \* c) None of:  
 1. Certified copies of the priority documents have been received.  
 2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

1) <input type="checkbox"/> Notice of References Cited (PTO-892)	4) <input type="checkbox"/> Interview Summary (PTO-413)
2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)	Paper No(s)/Mail Date. _____ .
3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date <u>20091209, 20070202</u> .	5) <input type="checkbox"/> Notice of Informal Patent Application
	6) <input type="checkbox"/> Other: _____ .

***Election/Restrictions***

Claims 46-53 have been withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 1-8-10.

Applicant's election of the article of Group I, claims 1-4, 8-19, 32-38 and 41 without traverse in the response filed 1-8-10 is acknowledged. Regarding Applicant's request that claims 28, 40 and 42-45 should be considered as part of the invention of Group I, these claimed have been incorporated in the elected group and reviewed in the instant Office Action such as set forth below.

***Claim Rejections - 35 USC § 102/103***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-4, 8-14, 17-19, 28, 40 and 42-45 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Branagan et al. (XP-002553675 Article: Wear-Resistant Amorphous and Nanocomposite Steel Coatings).

Branagan teaches a metallic glass laminate formed by thermal spray deposition (p. 2616, col. 1, first paragraph). Branagan further teaches that the density of the coating layer is > 99.9 % meaning the porosity of the coating layer is less than 0.01% (p. 2617, col. 1, Thermal Spray Coatings and Properties).

Branagan does not explicitly recite that the supercooled liquid temperature range  $\Delta T_x$  is equal to or greater than 30°C, however since it teaches that the alloys selected for the metallic glass alloy have low critical cooling rates for class formation, it is the position of the Examiner that the supercooled liquid temperature range would be within the claimed range. In the alternative, it would have been obvious to one of ordinary skill in the art at the time of the invention to have utilized an amorphous phase forming material having a high supercooled liquid temperature range  $\Delta T_x$  to insure the thus formed coating exhibited good properties in amorphous formability.

Regarding claims 2-3, the claims are drawn to an article, not the method of making. However, Branagan is considered to meet the recited method limitations wherein deposition occurs in a supercooled liquid state and via a thermal spraying method (p. 2616, col. 1, 1<sup>st</sup> par.).

Regarding claims 4 and 28, Branagan teaches the thickness of the coating may be as much as 330 and 1650  $\mu\text{m}$  (p. 2618 – Figures 7 and 8).

Regarding claims 8-9, Branagan teaches the spray method may comprise HVOF (p. 2616, col. 1, Experimental Procedure) which would form sprayed particles which are thinly collapsed as claimed.

Regarding claims 10-11, Branagan teaches the metallic glass contains at least one element such as Fe in a range of 63% (p. 2616, col. 1, Experimental Procedure).

Regarding claim 13, Branagan teaches the substrate may be selected from aluminum alloys (p. 2617, Thermal Spray Coating and Properties) which would meet the claim limitation regarding a light metal with the recited specific gravity.

Regarding claim 14, the sprayed coating of Branagan would inherently have some pattern even if the pattern was random. In the alternative, it would have been obvious to one of ordinary skill in the art to have recognized that a desirable structure or pattern could be formed in the coating with a reasonable expectation of success.

Regarding claims 17 and 19, although Branagan is silent to the metallic glass laminates ability to absorb hydrogen, as disclosed by Applicant in the specification in par [0013], metallic glasses that can be laminated on base materials without forming a pinhole may be used as hydrogen separation membranes. Since the metallic glass of Branagan does not form pinholes, it would be considered to be just as capable of absorbing hydrogen as the article claimed by Applicant.

Regarding claim 18, Branagan teaches that metallic glass bulks can be formed due to delamination of the substrate (p. 2618 col. 1). In the alternative, it would have been obvious to one of ordinary skill in the art to recognize that the metallic glass layer

could be separated from the substrate and utilized separately with a reasonable expectation of success.

Regarding claims 40 and 42-45, although Branagan is silent to the formed metallic glass laminate being a solder-corrosion resistant member, the article of Branagan would have been just as solder-corrosion resistant as the article claimed by Applicant since it is formed of the same materials, structure and properties such as claimed. Regarding the limitation that a contact surface to molten solder may be a lead-free solder, any surface of the laminate of Branagan could be contacted with a molten solder which may be any solder material including a lead-free solder. In the alternative, it is known in the art that metallic laminates having coatings of corrosion resistant amorphous alloys laminated thereon are suitable for a variety of uses including soldering iron tips. It would have been obvious to one of ordinary skill in the art to have utilized the amorphous alloy laminate of Branagan for a soldering iron tip since the laminate exhibits good properties of corrosion resistance and adhesion to the base layer.

#### ***Claim Rejections - 35 USC § 103***

Claims 15-16 and 32-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Branagan et al. (XP-002553675 Article: Wear-Resistant Amorphous and Nanocomposite Steel Coatings).

Regarding claims 15 and 16, Branagan is silent to the coating have a convexo-concave pattern or having a mirror-like smooth surface, however it would have been

obvious to one of ordinary skill in the art to have formed the coatings having desirable structural shapes and/or polished surfaces with a reasonable expectation of success.

One of ordinary skill would have been motivated to provide such structures to the coating layers so as to obtain coatings exhibiting desirable properties such as suitable anodic polarizations.

Regarding claims 32-34, Branagan is silent as to the substrate being porous, however it is known in the art to form metallic glass amorphous coatings on a variety of substrate materials including porous substrates. It would have been obvious to one of ordinary skill in the art to have formed the coating of Branagan on a porous substrate with a reasonable expectation of success. The thus formed laminate would exhibit a selective hydrogen gas permeability such as claimed.

Regarding claims 35-36, Branagan teaches a thickness of 330  $\mu\text{m}$  and although it is silent to the pore diameter, since it forms the thermal sprayed coating layer utilizing powders having an average size of 25  $\mu\text{m}$  (p. 2616, col. 2, A. Powder Production and Properties), one of ordinary skill would expect the pore diameter to fall within the claimed range.

Regarding claim 37, Branagan is silent to the substrate being tubular however it teaches that the HVOF deposition can be utilized to apply a coating to a wide variety of substrates (p. 2621. col. 1, CONCLUSIONS). It would have been obvious to one of ordinary skill to have applied the coating to any suitable shape including tubular substrates with a reasonable expectation of success.

Regarding claim 38, the metallic glass laminate of Branagan would be considered to meet the limitation of a gas separation membrane as claimed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JASON L. SAVAGE whose telephone number is (571)272-1542. The examiner can normally be reached on M-F 6:30-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jennifer McNeil can be reached on 571-272-1540. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jason Savage/  
Examiner  
3-12-10

/Jennifer C. McNeil/  
Supervisory Patent Examiner, Art Unit 1794